A STUDY ON THE EFFECTIVENESS OF MUSCLE STRENGTHENING TO IMPROVE GAIT SPEED IN STROKE PATIENTS

By

(Reg. No . 27101812)

PADMAVATH COLLEGE OF PHYSIOTHERAPY

PERIYANAHALLI

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Under the guidance of

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Submitted in Partial fulfillment of the requirements for the

Degree of **Master of Physiotherapy**

From

The Tamilnadu Dr. M.G.R. Medical University,

Chennai

PADMAVATH COLLEGE OF PHYSIOTHERAPY

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CERTIFICATE

This is to certify that the project entitled **"A STUDY ON THE EFFECTIVENESS OF MUSCLE STRENGTHENING TO IMPROVE GAIT SPEED IN STROKE PATIENTS "**

Submitted by the candidate

(Reg. No . 27101812)

is a bonafide work done in partial fulfillment of the requirements for the Degree of **Master of Physiotherapy** from

The Tamilnadu Dr. M.G.R. Medical University,

Chennai

Guide **Principal**

Viva-voce Examination held on _____

Internal Examiner **External Examiner**

DECLARATION

I hereby declare and present my dissertation entitled entitled **“A STUDY ON THE EFFECTIVENESS OF MUSCLE STRENGTHENING TO IMPROVE GAIT SPEED IN STROKE PATIENTS”** the outcome of the original research work undertaken and carried out be me , under the guidance of **Mr. G. ANANDAN, M.P.T. , MIAP.,** Associate Professor , Padmavathi College of Physiotherapy, Periyanahalli, Dharmapuri , Tamilnadu.

I also declare that the material of this dissertation had not formed in any basis for the award of any other Degree previously from the Tamilnadu Dr. M.G.R. Medical University, Chennai.

(SARATH SANKAR. S)

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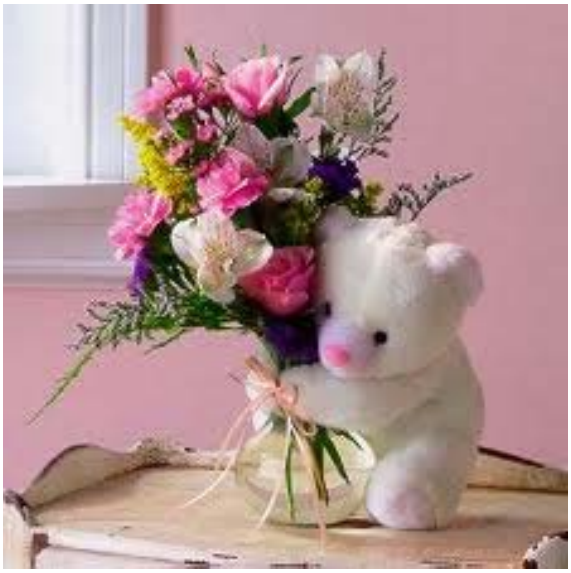

DEDICATED TO MY BELOVED

PARENTS , STAFFS

AND

LOVABLE FRIENDS

TABLE OF CONTENTS

INTRODUCTION

Stroke is a common neurological problem. The physical effects of stroke are variable & may include impairment in motor, emotional sensory system, language & perception.

Impairment of motor function involves paralysis or the muscle on the one side of the body contra lateral to the side of the brain lesion.

Even after intensive therapy during the first 6 months after stroke, a large proportion of stroke patients are left with significant residual disabilities. Muscle weakness has been recognized as one of the limiting factor in the motor rehabilitation of stroke subject. Strength training & Strength measurement testing to monitor status & recovery after stroke have both emerged as controversial issues.

Endurance training is also increasingly recognized as an important component with in cornprehensive rehabilitation program. Stroke patients are known to have low exercise endurance, which may further decline after discharge from formal rehabilitation. Low endurance may

compound the increased energy cost of movement associated with hemiparesis & further contributes to poor rehabilitation outcome.

STATEMENT OF THE STUDY

Effectiveness of muscle strengthening to improve gait speed in stroke patients.

AIM & NEED OF THE STUDY

The Aim of the study is to find out whether muscle strengthening exercises is effective in improving gait speed in stroke patients.

The results of the study with help the physiotherapists to bring a better functional outcome in stroke patients.

REVIEW OF LITERATURE

I. INDIA M, EDBERG E, MONTGOMERY 3, GILLS M, (1973), ne group receiving resisted exercises showed greater increase in strength. Moreover, a larger proportion in activities of daily living.

2. BRANDSTATER, et. al., (1983), Reported that there is a strong relationship between symmetry of swing phase & motor recovery & also provide that walking speed correlate with motor recovery.

3. BOHAMON R W, (1988), Concluded that, it is doubtful that higher percentage increase in strength will allow patients with weaker muscles to gain strength to the point that their muscles are as strong as those of 3 patients who were stronger initially

4. NAKAMURA R, et. al., (1988), stated that strength of affected side was primary determinant of walking.

5. BOHANNON R W, et. al., (1991) stated strength deficits affect gait performance in stroke patients.

6**. WAGENAR** et al (1992), Have used walking speed as a basis for kinematics analysis of hemiplegics gait.

7. ENGARDT et. al. (1995). The relative benefits Of concentric Vs. eccentric strengthening found both techniques equally effective for increasing muscle in the hemiparetic limb.

8. 'WOLFSON L., et. al., (1995)**.** Identified a strong relationship of lower extremity strength to gait.

9. RODRIQUEX AA, et. al., (Archives of physical medicine & rehabilitation, 1996 age 77(8)801-5) they found that home, based practice model result in improved gait the perception of improved function.

10.TEIXERIA - SALMALA L. F, NADEAU S, McBride I, ONLEY SJ(Journal. Rehab. Med. 2002 mar, 33(2): 53 — 60) Study found out that compared program of muscle strengthening & physical conditioning, resulted in significant increase in gait speed associated with improvements in stroke patients.

11.BILLPA et. al., conducted a study to evaluate the potential association of muscular strength & endurance at baseline with the prevalence of functional limitation, they suggests that maintains of strength throughout the life span may reduce prevalence of functional limitation.

DESIGN AND METHODOLOGY

RESEARCH DESIGN

- The study is quasi experimental in nature.

CRITERIA FOR SELECTION

- Ambulant post stroke patients were only taken.
- Both males & females with in the age group 40 - 60 years were only taken.
- Patients with voluntary control grade 5 & above (brunnstom scale).
- Patient who are able to isolate the individual movement were only taken.
- Patients who are able to isolate the individual movement were only taken.
- Patients with any other associated problems were not taken.

POPULATION

All the subjects who satisfied the selection criteria were taken as the population for the study.

SAMPLE SIZE & METHOD OF SELECTION

15 Samples were selected from the population using sample random sampling technique.

VARIABLES

Independent variable

- Muscle Strengthening Exercise

Dependent variable

- Gait Speed

VALIDITY AND RELIABILITY OF THE TOOLS USED

Distance traveled / Time taken is a valid & reliable tool to measure gait speed in stroke patients.

SETTINGS

The study was done at the physiotherapy outpatient department of Vinayaka mission's medical college hospital, Salem.

METHODOLGY

15 subjects who were selected using simple random sampling from the population under went a pre — test measurement of gait speed.

Gait speed was assessed while the subjects were made to walk in a 10 meters hall way at their maximum speed, with or without their usual assistive orthosis. The time to cover the 10 meters distance was recorded with a digital stop watch. All the subjects were given 3 chances & the best was recorded.

A 4 weeks program consisting of a warm up, lower extremity muscle strengthening & a cool - down will be given.

A post test scores of gait speed had been taken & statistically analyzed.

PROCEDURES

Each supervised training session includes:

- A 5 — 10 minute warm up consisting of mild stretching & range of motion exercise.
- Strength training.
- A cool down period, consisting of 5 — 10 minutes of muscular relaxation & strengthening exercise.

During each session emphasis will be put on stretching the lower extremity muscles.

The strengthening exercises was performed concentrically & eccentrically for about 30 minutes for hip flexors & extensors, hip

adductors & abductors, knee flexors & extensors, ankle dorsi flexors & plantar flexors.

Materials like sandbags, weight cuff & weighted boots were used. No special equipments were used; the programs were devised for subjects according to each of their capacities.

The maximum weight, a subject can lift single time was used to load for the Ist 2 weeks at 25% of single repetition maximum. Subjects were instructed to perform 3 sets of 10 repetitions for each exercise with a 1 to 2 minute rest period between sets.

By the 3rd week or as subjects can tolerate load was increased to 50% of the single repetition maximum. The maximum repetition will be reassessed every 2 weeks. This procedure was followed 2 times each day for 4 weeks.

Post test measurements were taken at the end of the 4th week in a similar fashion as the pretest.

OBSERVATION AND ANALYSIS

The collected data were analyzed using paired ‘t’ test

Table 1.1

Muscle Strengthening Exercise (Paired ‘t’ test)

S.No	Variable	‘t’ calculated	‘t’ table value
1	Gait speed	4.776	2.145

‘t’ calculated value> ‘t’ table value

- Significance at 5% level

  The Value shows a significant improvement in Gait speed

RESULTS AND DISCUSSION

RESULTS

The following results were obtained after subjecting the data to statistical analysis.

• There is a significant improvement in gait speed following the application of muscle strengthening exercises in stroke patients.

DISCUSSION

The results of the study are in favour of muscle strengthening to improve gait speed in stroke patients. This may be because any muscle affected by spasticity is weak & not able to generate power to carry out function like gait. Strengthening the muscles would help to generate power & thereby result in enhanced performance.

The result is also supported by **Teixeria - Salmala L. F, Nadeau S, McBride 1, Onley SJ** (Journal. Rehab. Med. 2002 mar, 33(2): 53 — 60) Study found out that compared program of muscle strengthening & physical conditioning resulted in significant increase in gait speed associated with improvements in stroke patients. WOLFSON L., et. al., (1995). Identified a strong relationship of lower extremity strength to gait.

RECOMMENDATIONS FOR FURTHER STUDY

- A similar study can be done to found the effectiveness of endurance exercises in improving the functional ability of stroke patients.

- A similar study can be done to find the effectiveness of stretching & strengthening exercise in improving gait speed in stroke patients.

CONCLUSION

The results of the study make us conclude that muscle strengthening exercises are effective in improving gait speed in stroke patients

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APPENDIX-I

MASTER CHART

SI.No.	Gait Speed (Sec)	
	Pre test Score	**Post test Score**
1.	30	28
2	28	28
3	33	32
4	27	26
5	26	24
6	30	30
7	31	31
8	28	25
9	30	28
10	26	23
11	29	25
12	31	30
13	30	30
14	27	24
15	28	25